

Fall Semester Chemistry Review

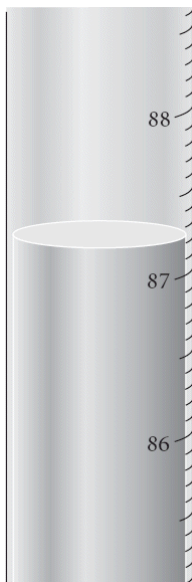
Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Identify a solid. 1) _____
A) no definite shape and no definite volume B) definite volume and definite shape
C) definite volume and no definite shape D) no definite shape and definite volume
- 2) A substance that can't be chemically broken down into simpler substances is 2) _____
A) a homogeneous mixture.
B) an electron.
C) a heterogeneous mixture.
D) a compound.
E) an element.
- 3) Decanting is 3) _____
A) dissolving a solid into a liquid.
B) separating a solid from a liquid by pouring off the liquid.
C) pouring a mixture through a filter paper to separate the solid from the liquid.
D) a process in which the more volatile liquid is boiled off.
E) heating a mixture of two solids to fuse them together.
- 4) A physical change 4) _____
A) occurs when propane is burned for heat.
B) occurs when glucose is converted into energy within your cells.
C) occurs when sugar is heated into caramel.
D) occurs when water is evaporated.
E) occurs when iron rusts.
- 5) Which of the following represents a chemical property of hydrogen gas? 5) _____
A) It is less dense than air.
B) It is gaseous at room temperature.
C) It reacts explosively with oxygen.
D) It is tasteless.
E) It is colorless.
- 6) Determine the volume of an object that has a mass of 455.6 g and a density of 19.3 g/cm³. 6) _____
A) 18.5 mL B) 31.2 mL C) 42.4 mL D) 87.9 mL E) 23.6 mL
- 7) A student performs an experiment to determine the density of a sugar solution. She obtains the following results: 1.11 g/mL, 1.81 g/mL, 1.95 g/mL, 1.75 g/mL. If the actual value for the density of the sugar solution is 1.75 g/mL, which statement below best describes her results? 7) _____
A) Her results are neither precise nor accurate.
B) Her results are precise, but not accurate.
C) Her results are both precise and accurate
D) Her results are accurate, but not precise.
E) It isn't possible to determine with the information given.

8) Read the temperature with the correct number of significant figures.

8) _____



A) 87.20°C

B) 87.200°C

C) 87.2000°C

D) 87.2°C

E) 87°C

9) What answer should be reported, with the correct number of significant figures, for the following calculation? $(433.621 - 333.9) \times 11.900$

9) _____

A) 1.19×10^3

B) 1.186799×10^3

C) 1.18680×10^3

D) 1.187×10^3

E) 1.1868×10^3

10) How many significant figures are in the measurement, 463.090 m?

10) _____

A) 2

B) 3

C) 5

D) 6

E) 4

11) What mass (in mg) does 2.63 moles of nickel have?

11) _____

A) 2.23×10^4 mg

B) 129 mg

C) 3.56×10^5 mg

D) 1.54×10^5 mg

E) 44.8 mg

12) How many phosphorus atoms are contained in 158 kg of phosphorus?

12) _____

A) 3.07×10^{27} phosphorus atoms

B) 8.47×10^{24} phosphorus atoms

C) 1.18×10^{24} phosphorus atoms

D) 2.95×10^{27} phosphorus atoms

E) 3.25×10^{28} phosphorus atoms

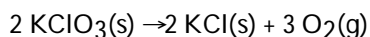
- 13) Give a possible molecular formula for C_3H_5ClO . 13) _____
A) $C_6H_{12}Cl_2O_2$
B) $C_5H_{10}Cl_2O_2$
C) $C_6H_{10}O_2$
D) $C_6H_{10}ClO_2$
E) $C_6H_{10}Cl_2O_2$
- 14) Determine the name for $TiCO_3$. Remember that titanium forms several ions. 14) _____
A) titanium (II) carbonite
B) titanium (II) carbonate
C) titanium (I) carbonate
D) titanium carbide
E) titanium carbonite
- 15) Give the name for $NaHSO_3$. 15) _____
A) sodium hydrogen sulfate
B) sodium sulfite
C) sodium sulfide
D) sodium sulfate
E) sodium hydrogen sulfite
- 16) Determine the name for $CoCl_2 \cdot 6H_2O$. Remember that Co forms several ions. 16) _____
A) cobalt (II) chloride hexahydrate
B) cobalt chloride hydrate
C) cobalt (I) chloride
D) cobalt (I) chloride heptahydrate
E) cobalt (II) chloride heptahydrate
- 17) Determine the name for P_4O_{10} . 17) _____
A) phosphorus (II) oxide
B) diphosphorus pentoxide
C) tetraphosphorus decoxide
D) phosphorus (IV) oxide
E) phosphorus oxide
- 18) Calculate the molar mass of $Ca_3(PO_4)_2$. 18) _____
A) 310.18 g/mol
B) 246.18 g/mol
C) 215.21 g/mol
D) 87.05 g/mol
E) 279.21 g/mol
- 19) Calculate the mass percent composition of sulfur in $Al_2(SO_4)_3$. 19) _____
A) 9.372 % B) 21.38 % C) 35.97 % D) 28.12 % E) 42.73 %
- 20) Determine the molecular formula of a compound that is 49.48% carbon, 5.19% hydrogen, 28.85% nitrogen, and 16.48% oxygen. The molecular weight is 194.19 g/mol. 20) _____
A) $C_8H_{12}N_4O_2$ B) $C_4H_5N_2O$ C) $C_8H_{10}N_2O$ D) $C_8H_{10}N_4O_2$

- 21) Write a balanced equation to show the reaction of sulfurous acid with lithium hydroxide to form water and lithium sulfite. 21) _____
- A) $\text{HSO}_3(\text{aq}) + \text{LiOH}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{LiSO}_3(\text{aq})$
 B) $\text{H}_2\text{S}(\text{aq}) + 2 \text{LiOH}(\text{aq}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) + \text{Li}_2\text{S}(\text{aq})$
 C) $\text{H}_2\text{SO}_3(\text{aq}) + 2 \text{LiOH}(\text{aq}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) + \text{Li}_2\text{SO}_3(\text{aq})$
 D) $\text{HSO}_4(\text{aq}) + \text{LiOH}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{LiSO}_4(\text{aq})$
 E) $\text{H}_2\text{SO}_4(\text{aq}) + \text{LiOH}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{Li}_2\text{SO}_4(\text{aq})$
- 22) When the following equation is balanced, the coefficients are _____. 22) _____
- $$\text{Al}(\text{NO}_3)_3 + \text{Na}_2\text{S} \rightarrow \text{Al}_2\text{S}_3 + \text{NaNO}_3$$
- A) 2, 1, 3, 2 B) 2, 3, 1, 6 C) 1, 1, 1, 1 D) 4, 6, 3, 2 E) 2, 3, 2, 3
- 23) Calcium carbide (CaC_2) reacts with water to produce acetylene (C_2H_2): 23) _____
- $$\text{CaC}_2(\text{s}) + 2\text{H}_2\text{O}(\text{g}) \rightarrow \text{Ca}(\text{OH})_2(\text{s}) + \text{C}_2\text{H}_2(\text{g})$$
- Production of 13 g of C_2H_2 requires consumption of _____ g of H_2O .
 A) 9.0 B) 4.5 C) 4.8×10^{-2} D) 4.8×10^2 E) 18
- 24) What mass in grams of hydrogen is produced by the reaction of 4.73 g of magnesium with 1.83 g of water? 24) _____
- $$\text{Mg}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{Mg}(\text{OH})_2(\text{s}) + \text{H}_2(\text{g})$$
- A) 0.102 B) 0.0485 C) 0.0162 D) 0.204 E) 0.219
- 25) Solid aluminum and gaseous oxygen react in a combination reaction to produce aluminum oxide: 25) _____
- $$4\text{Al}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{Al}_2\text{O}_3(\text{s})$$
- In a particular experiment, the reaction of 2.5 g of Al with 2.5 g of O_2 produced 3.5 g of Al_2O_3 . The % yield of the reaction is _____.
 A) 74 B) 66 C) 37 D) 26 E) 47
- 26) According to the following reaction, how many moles of $\text{Fe}(\text{OH})_2$ can form from 175.0 mL of 0.227 M LiOH solution? Assume that there is excess FeCl_2 . 26) _____
- $$\text{FeCl}_2(\text{aq}) + 2 \text{LiOH}(\text{aq}) \rightarrow \text{Fe}(\text{OH})_2(\text{s}) + 2 \text{LiCl}(\text{aq})$$
- A) 1.99×10^{-2} moles
 B) 5.03×10^{-2} moles
 C) 6.49×10^{-2} moles
 D) 3.97×10^{-2} moles
 E) 2.52×10^{-2} moles

- 27) Determine the molarity of a solution formed by dissolving 468 mg of MgI_2 in enough water to yield 50.0 mL of solution. 27) _____
 A) 0.0651 M B) 0.0297 M C) 0.0936 M D) 0.0107 M E) 0.0337 M
- 28) If a sample of 0.29 moles of Ar occupies 3.8 L under certain conditions, what volume will 0.66 moles occupy under the same conditions? 28) _____
 A) 8.6 L B) 12 L C) 17 L D) 5.0 L E) 15 L
- 29) What volume (in mL) will a sample of F_2 gas occupy in a syringe at 5.5 atm, if the F_2 has a volume of 25.0 mL at 1.2 atm? 29) _____
 A) 7.6 mL B) 17 mL C) 3.8 mL D) 5.5 mL E) 11 mL
- 30) A large balloon is initially filled to a volume of 25.0 L at 353 K and a pressure of 2575 mm Hg. What volume of gas will the balloon contain at 1.35 atm and 253 K? 30) _____
 A) 58.6 L B) 22.2 L C) 45.0 L D) 11.4 L E) 87.5 L
- 31) What pressure will 14.0 g of CO exert in a 3.5 L container at 75°C? 31) _____
 A) 6.4 atm B) 5.0 atm C) 4.1 atm D) 2.3 atm E) 1.1 atm
- 32) Determine the density of NH_3 gas at 435 K and 1.00 atm. 32) _____
 A) 2.24 g/L B) 2.10 g/L C) 0.477 g/L D) 0.321 g/L E) 0.851 g/L
- 33) A 0.334 g sample of an unknown halogen occupies 109 mL at 398 K and 1.41 atm. What is the identity of the halogen? 33) _____
 A) I_2 B) F_2 C) Br_2 D) Cl_2 E) Ge
- 34) The following reaction is used to generate hydrogen gas in the laboratory. If 243 mL of gas is collected at 25°C and has a total pressure of 745 mm Hg, what mass of hydrogen is produced? A possibly useful table of water vapor pressures is provided below. 34) _____

$\text{Mg(s)} + 2 \text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$	<u>T (°C)</u>	<u>P (mm Hg)</u>
	20	17.55
	25	23.78
	30	31.86

- A) 0.0449 g H_2
 B) 0.0196 g H_2
 C) 0.0144 g H_2
 D) 0.0717 g H_2
 E) 0.0190 g H_2
- 35) Determine the volume of O_2 (at STP) formed when 50.0 g of KClO_3 decomposes according to the following reaction. The molar mass for KClO_3 is 122.55 g/mol. 35) _____



- A) 14.6 L B) 9.14 L C) 12.3 L D) 8.22 L E) 13.7 L

- 36) A mixture of 1.0 mol He and 1.0 mol Ne are at STP in a rigid container. Which of the following statements is TRUE? 36) _____
- A) Both gases have the same molecular speed.
 - B) Both gases have the same average kinetic energy.
 - C) The mixture has a volume of 22.4 L
 - D) Both gases contribute equally to the density of the mixture under these conditions.
 - E) All of the above are TRUE.
- 37) Convert 1.50 atm to torr. 37) _____
- A) 1520 torr B) 1000 torr C) 875 torr D) 1140 torr E) 760 torr
- 38) A gas occupies 4.23 L at 2.25 atm. What is the volume at 3.46 atm? 38) _____
- A) 32.9 L B) 6.50 L C) 1.84 L D) 2.75 L E) 0.364 L
- 39) Place the following gases in order of increasing density at STP. 39) _____
- F₂ NH₃ N₂O₄ Ar
- A) Ar < F₂ < NH₃ < N₂O₄
 - B) Ar < N₂O₄ < F₂ < NH₃
 - C) N₂O₄ < Ar < F₂ < NH₃
 - D) NH₃ < F₂ < Ar < N₂O₄
 - E) F₂ < Ar < N₂O₄ < NH₃
- 40) What volume will 4.91×10^{22} atoms of Ar occupy at STP? 40) _____
- A) 2.00 L B) 1.83 L C) 2.24 L D) 3.11 L E) 1.10 L